# Rhodora

## JOURNAL OF THE
## NEW ENGLAND BOTANICAL CLUB.

Conducted and published for the Club, by
BENJAMIN LINCOLN ROBINSON Editor-in-chief.
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Vol. 8. February, 1906. No. 86.

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Boston, Mass.
740 Exchange Building.

Providence, R. I.
Preston and Rounds Co.

**RHODORA.**—A monthly journal of botany, devoted primarily to the flora of New England. Price $1.00 per year ($1.25 to all foreign countries except Canada); single copies 15 cents. Volume 1, $1.50. All remittances by check or draft, except on Boston or New York, must include ten cents additional for cost of collection. Notes and short scientific papers, relating directly or indirectly to the plants of the northeastern states, will be gladly received and published to the extent that the limited space of the journal permits. Forms will be closed five weeks in advance of publication. Authors (of more than one page of print) will receive 25 copies of the issue in which their contributions appear. Extracted reprints, if ordered in advance, will be furnished at cost.

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Subscriptions, advertisements, and business communications to
W. P. RICH, 300 Massachusetts Avenue, Boston, Mass.

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JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

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# THE SALT-MARSH IVA OF NEW ENGLAND.

Harley Harris Bartlett.

The northern and southern forms of the plant known as *Iva frutescens* differ so widely in several points that it seems best to treat them as distinct species. The northern plant, as it occurs in Massachusetts, is a shrubby perennial from two to four feet tall, generally found on the muddy banks of tidal streams and along salt-marsh ditches. Each clump consists of from ten to a hundred or more stems from a single woody base. The individual stems are simple below the paniculate inflorescence except in very old plants, where branches may occur several nodes below the inflorescence. *Iva frutescens* as described by Small in the "Flora of the Southeastern United States" is from 1 to 3.5 meters (3–11.5 ft.) tall. No accessible specimens show the base of this large southern form, but as nearly as can be judged from herbarium material it has freely branched stems. This is probably due to the fact that in the south the small branches are not deciduous at the end of the growing season, but continue their growth from year to year.

The most noticeable difference between the two plants lies in the leaves, which are much larger and broader in the northern plant than in the southern. The stem leaves of all available specimens of both species were measured and the results expressed as ratio of length to breadth. The ratio varied from $\frac{1}{1\cdot75}$ to $\frac{1}{3\cdot6}$ (average $\frac{1}{2\cdot7}$) in the case of the northern plant, from $\frac{1}{4}$ to $\frac{1}{7}$ (average $\frac{1}{5}$) in the case of the southern plant. That is, the leaves of the northern plant are relatively twice as broad as those of the southern. Other significant differences lie in the heads and achenes. The head of the southern plant is about 4 mm. in diameter at maturity, whereas the head of the northern plant measures 6 mm. if well developed. In both plants the involucre is usually of five obtuse bracts, but in case the number is not five, variation occurs in opposite directions. Occasionally the southern plant has four bracts, and the northern plant six. This same variation is found in the number of fertile flowers, which are five or four in the southern plant and five or six in the northern. Achenes of the southern plant vary from 2 to 2.4 mm. in length, with an average of 2.1 mm. Those of the northern plant vary from 3 to 3.3 mm., with an average of 3.1 mm. Strange to say, the plants which seem most intermediate between typical extremes are those from Texas, at the southern limit of range.

There can be little doubt that the name *Iva frutescens* L. must be applied to the plant of the Southeastern States. The description of the "Species Plantarum" includes a plant from Peru, which is probably some other species. The northeastern plant is here proposed as new.

**Iva oraria** sp. nov., fruticosa 0.5–1 m. altitudine; caulibus solum superiore parte ramosis, plus minusve subscabris; foliis plerumque oppositis, ovatis, obtusis vel acutis, profunde serratis; capitulis axillaribus deflexis pedicellatis depresso-globosis; involucro pentaphyllo vel raro hexaphyllo, ad maturitatem 6 mm. diametro; floribus fertilibus 5 aut raro 6; fructu 3–3.3 mm. longitudine.— Salt marshes, New Hampshire to New Jersey. Differs from *I. frutescens* in the larger size of the fruit, the greater diameter of the involucre, and the much broader leaves. Type, Bartlett 354 (Hb. Bartlett), collected on the banks of the Charles River, Boston, Massachusetts, 18 September, 1905.

Specimens examined:

*Iva oraria:* — MASSACHUSETTS: Boston, *Bartlett 354 and 408;* Boston, Aug. 19, 1853, *Wm. Boott;* Newbury, Aug. 7, 1899, *Williams;* Ipswich, *Oakes.* RHODE ISLAND: Tiverton, *Greenman 1706.* CONNECTICUT: East Haven, 1886 *A. L. Winton;* Orange, *Andrews 90.* NEW JERSEY: 1832, *Asa Gray.*

*Iva frutescens* L.:— NORTH CAROLINA: Southport, *Biltmore Herbarium 2585a.* FLORIDA: Titusville, *Nash 2287;* Mouth of St. John's, *Palmer 270;* Apalachicola, *Biltmore Herbarium 2585b;* Lee County, *Hitchcock 153;* Duval Co., *Curtiss 1396;* St. Augustine, *Curtiss 6457.* MISSISSIPPI: Biloxi, *Pollard 1183.* TEXAS: Galveston Id., *Tracy 7716;* Mouth of the Brazos, Aug. 1843, *Lindheimer.*

GRAY HERBARIUM.

# FURTHER REMARKS ON THE COASTAL PLAIN PLANTS OF NEW ENGLAND, THEIR HISTORY AND DISTRIBUTION.

ROLAND M. HARPER.

SINCE the publication of my preliminary paper on this subject, in RHODORA last April, I have accumulated some more evidence on the same lines, which is presented herewith. At the same time I take this opportunity to correct some geographical errors which crept into the former paper. In defining the coastal plain, I unaccountably overlooked the fact that the areas of Triassic rocks along the fall-line in New Jersey, North Carolina and elsewhere are usually classed with the Piedmont region rather than with the coastal plain. Cretaceous should therefore be substituted for Mesozoic in the first paragraph.

I also failed to notice that there is one eastern state which contains neither coastal plain nor glacial drift, as far as known; namely, West Virginia. It is of considerable interest therefore to determine which if any of the plants recorded as being nearly confined to the Pleistocene formations occur in that state. Fortunately there is an excellent flora of West Virginia, by Dr. Millspaugh, published in 1892, and on referring to it I find the following items of interest. The genera *Xyris*, *Eriocaulon*, *Pontederia*, *Tofieldia*, *Sarracenia* and *Utricularia* are not mentioned in the catalogue at all, though most of them are probably represented in all the surrounding states. *Potamogeton* and *Drosera* are each represented by only one species, the former from two counties and the latter from one. Among the species enumerated in my preliminary list *Sagittaria graminea* is reported from only one county, *Dulichium* from two, *Eleocharis tuberculosa* from one, *Eriophorum Virginicum* from two, *Habenaria ciliaris* and *Rosa Carolina* from three, *Aronia arbutifolia* from four, *Polygala cruciata* from two, *Viola lanceolata* from one, *Rhexia Virginica* from seven, *Azalea viscosa* from four, and *Pieris Mariana* and *Gaylussacia dumosa* from two. But it will be noticed that I have already indicated the occurrence of nearly all of these at isolated stations in and near the mountains in the states farther south. In a later edition of his flora (1896) Dr. Millspaugh says: "There is to-day neither pond nor lake within the limits of the State." This corroborates a statement on page 76 of my former paper.

As for the age of these coastal plain species, some of them seem to be a little older than I formerly supposed. *Dulichium* has recently been reported in a fossil state from interglacial deposits in Denmark,[1] and in Dr. Knowlton's catalogue of Cretaceous and Tertiary plants of North America (Bull. 152, U. S. Geol. Surv., 1898) *Chamaecyparis*, *Brasenia*, *Drosera rotundifolia* and several existing species of *Potamogeton* are reported from Pleistocene deposits in Canada or New Jersey, and *Celthra alnifolia* and *Leucothoe racemosa* from Miocene in New Jersey. But on account of the fragmentary nature of the fossil material it is perhaps not safe to claim absolute specific identity with living plants. Dr. Hollick, who reported the two last-named species, now admits that their specific relationships are very doubtful. It is altogether likely however that some of the species mentioned in my former list are of more recent origin than others, and it may some time be possible to classify them according to age with some certainty.

The glacial-coastal plants would seem to be as a rule somewhat rare in the northern states, judging from the numerous lists of rare plants or additions to local floras which have appeared in RHODORA since its inception, several of which consist largely of just such species.[2]

The following species and genera might be added to the list of those confined to the glaciated region and coastal plain, or nearly so.

*Zizania aquatica* L. West to Manitoba, south to Florida, West Tennessee and Texas. Also in Asia (if it is all the same species). In the Atlantic coastal plain states this seems to be chiefly confined to brackish marshes, while in the glaciated region it is said to grow in lakes. There are some slight differences between the northern and coastal plants, which may indicate an incipient differentiation into two species.[3]

*Hemicarpha micrantha* (Vahl) Britton. West to Michigan and Nebraska, south to Florida, Illinois, Missouri and Mexico. (Not known in Georgia.) Also reported from the West Indies and South America, but there may possibly be more than one species involved.

*Carex bullata* Schk. West to Lycoming County, Pennsylvania

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[1] See Hartz, Engler Bot. Jahrb. **36**: 78–81. *f.* 1–4. Feb. 28, 1905, Berry, Bot. Gaz. **39**: 232, March, 1905.

[2] For example the papers by Mr. Harger in June, 1900, Mr. Knowlton in June and October, 1900, Dr. Haberer in May and June, 1905, and Dr. Lewis in October, 1905; and my own in 1899 and 1900.

[3] See Brown & Scofield, Bull. 50, Bureau Plant Industry U. S. Dept. Agr. 1903; Scofield, Bull. 72 pt. 2. 1905.

(*Porter*) and south to Georgia (where I have collected it more than once), but with some considerable gaps in its known range.[1]

*Carex albolutescens* Schw. West to Pennsylvania (*Porter*) and Manitoba, south to Virginia (*Kearney*), Alabama (*Mohr*), Texas and Central America (?).[2]

*Carex alata* Torr. West to Michigan, south to Florida and Mississippi.[3]

*Carex sterilis* Willd. (*C. Atlantica* Bailey.) West to Pennsylvania, south to Florida and Mississippi.[4]

*Juncus militaris* Bigel. West to the Pocono region of Pennsylvania, south to Maryland.

*Iris versicolor* L., *Pogonia ophioglossoides* (L.) Ker, and *Limodorum tuberosum* L., common plants in the glaciated region, in Georgia seem to be strictly confined to the coastal plain and in West Virginia are each reported from only one county, but they are known from so many interior stations in other states that they are scarcely worth mentioning in this connection.

*Nelumbo lutea* (Willd.) Pers. West to Minnesota and Nebraska, south to Florida, Missouri and Texas.

*Nymphaea* (*Nuphar*). The species with floating leaves, three or four in the north and about the same number in the south, seem to be confined to the glaciated region and coastal plain, while the only one known in the Piedmont region is *N. advena*, with erect leaves.[5]

*Triadenum Virginicum* (L.) Raf. (*Elodes campanulata* Pursh). West to Manitoba and Nebraska (?), south to northern Florida and Louisiana.

*Vaccinium Oxycoccus intermedium* Gray (see Fernald, RHODORA **4**: 237. 1902). West to British Columbia, south to southeastern Virginia (*Kearney*) and northeastern North Carolina (*Croom*, Am. Jour. Sci. **26**: 316. 1834; as *Oxycoccus macrocarpus*).

*Sclerolepis verticillata* (Mx.) Cass. New Hampshire (*F. T. Lewis*[6]), and from New Jersey to Florida and Alabama (*Mohr*) in the coastal plain.

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[1] See RHODORA **2**: 69. 1900; **3**: 51–52, 198. 1901.

[2] For notes on this species see Fernald, Proc. Am. Acad. **37**: 472–473. 1902.

[3] See Fernald, l. c., 476.

[4] See Fernald, l. c. 485.

[5] See paper by Gerrit S. Miller, Jr. in Proc. Biol. Soc. Wash. **15**: 11–13. *f.* 1. *pl.* 2. 1902, where two species are distinguished and an attempt is made to explain their distribution on climatic grounds.

[6] RHODORA **7**: 186–187. 1905.

*Arnica.* In Eastern North America this genus has one representative very nearly confined to the coastal plain (barely reaching the Piedmont region in extreme southeastern Pennsylvania, and ranging from there southward to Florida), while the others seem to be confined to the glaciated region.[1]

If botanists residing near the terminal moraine and the fall-line will bear these plants in mind hereafter, they can doubtless furnish us with some interesting notes on their local distribution, and at the same time discover other cases of the same kind.

The following papers should be added to the bibliography of the subject.

Adams, Chas. C. The postglacial dispersal of the North American biota. Biol. Bull. 9: 53–71. 1905.

Contains references to some earlier papers by the same author which should also be consulted.

Beal, W. J. Michigan Flora. 147 pp. Lansing, 1904.

Harshberger, J. W. The comparative age of the different floristic elements of Eastern North America. Proc. Acad. Nat. Sci. Phila. **56**: 601–615. 1904.

Hollick, Arthur. Notes on Block Island [R. I.]. Ann. N. Y. Acad. Sci. **11**: 55–88. 1898.

Pages 66–70 contain an interesting discussion of the origin of the flora.

Millspaugh, C. F. Preliminary catalogue of the flora of West Virginia. Bull. W. Va. Agric. Exp. Sta. **2**: 315–538. 1892.

Porter, T. C. Flora of Pennsylvania. 362 pp. and map. 1903.

In this work the distribution of each species is given in detail, by counties, and it is readily seen that the coastal plain element of the flora is very nearly confined to the northeastern quarter of the state, which is glaciated.

University, Ala.

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[1] See Fernald, Rhodora 7: 146. 1905.

# SOME AMERICAN REPRESENTATIVES OF ARENARIA VERNA.

M. L. FERNALD.

THE names *Arenaria verna* and *A. hirta* have long been familiar to American botanists, and they have been so long associated with certain alpine and high-northern plants that their American application is rarely questioned. A recent close examination of some plants of this preplexing group has convinced the writer, however, that in our interpretation of these names we have gradually wandered far from their true European significance.

In America the name *Arenaria verna* has been recently applied to high-northern caespitose and strictly glabrous plants, while most of the pubescent specimens have been assigned to var. *hirta*. All the plants thus treated have very small petals, usually shorter than the sepals or sometimes wanting. In Europe, however, the plant which is understood as *A. verna* is usually very glandular-pubescent and with very numerous comparatively showy flowers, the corolla equalling or exceeding the calyx. In these characters the true *A. verna* is obviously quite unlike the plants which ordinarily pass under that name in America; although a plant with characters as in typical *A. verna* of Europe has been found very locally at high altitudes in the Northwest, where many other European species unknown or essentially unknown in eastern America (*Phegopteris alpestris*, *Eriophorum opacum*, *Luzula glabrata*, *spadicea* and *arcuata*, *Ranunculus aquatilis*, etc.) are known to occur.

An attempt to clear the confusion surrounding the American plants which have recently been called *Arenaria verna* has led the writer to prepare the following synopsis. Two of the plants included are of closer affinity to other species than to *A. verna*, but since in America they have recently been confused with the latter species it is thought best to include them in the present notes.

* Leaves linear-subulate, 3-ribbed: sepals with 3 essentially uniform parallel ribs: seeds reddish-brown, 0.4–0.6 mm. long.

ARENARIA VERNA L. Caespitose, *glandular-pubescent:* branches 0.4–1.5 dm. long: *panicle many-flowered: calyx equalling* or *scarcely as long as the corolla, in fruit* narrow-campanulate, 3–3.5 *mm. long;* sepals lanceolate to lance-ovate, acuminate, with narrow hyaline margins: capsule distinctly exserted.— Mant. i. 72 (1767). *Alsine verna* Wahl. Fl. Lapp. 129 (1812); Gürke, Pl. Eur. ii. 255 (1899,) which see for detailed synonymy.— Europe and Asia. Very rare in America, seen only from the Northwest. Alberta, Crow Nest Pass (*J. Macoun*, no. 18,273): British Columbia, summit of Mt. Arrowsmith, Vancouver Island (*J. Macoun*): Washington, volcanic sand, altitude 2745 m., Mt. Rainier (*C. V. Piper*, no. 2115).

Var. **propinqua** (Richardson) comb. nov. Loosely or densely caespitose, *glandular-pubescent*, the filiform branches 2–15 cm. long, bearing usually 2 *to* 5 *flowers: fruiting calyx* 2.5–3.5 *mm. long*, the narrow-ovate hyaline-margined *sepals* short-acuminate, *usually exceeding the* oblong or narrowly obovate *petals*, and shorter than the capsule.—*A. propinqua* Richardson in Frankl. Jour. 738—reprint 10 (1823); Hook. Fl. Bor.-Am. i. 99 (1830) in part; Torr. & Gray, Fl. i. 181 (1838). *A. verna*, var. *hirta* Watson in King, Rep. 41 (1871); Porter and Coulter, Fl. Col. 14 (1874); Watson, Bibl. Index, 98 (1878) in part, and in Gray, Man. ed. 6, 86 (1890); Robinson in Gray, Syn. Fl. i. pt. 1, 246 (1897) in part. *A. verna* Britton & Brown, Ill. Fl. ii. 33, fig. 1504 (1897) in part. *A. verna*, var. *equicaulis* A. Nelson, Bull .Torr. Cl. xxvi. 352 (1899). *Alsine verna*, *η. hirta* Fenzl in Ledeb. Fl. Ross. i. 349 (1841) in part. *Alsine propinqua* Lange, Fl. Dan. xvii. 7, 8 (1877) as to Greenland plant. *Alsine verna*, var. *propinqua* Grönl. Isl. Fl. 33 (1881) as to name.—Arctic America, south to Quebec and northern Vermont, and on the higher mountains to Arizona and southern California. Greenland. The following specimens have been examined from eastern America. Labrador, near Hoffenthal (Kruth): Quebec, Mt. Albert, Gaspé Co. (*Allen. Collins & Fernald*); limestone detritus, Percé (*Collins, Fernald & Pease. Collins & Fernald*, no. 79. *Williams*): Vermont, Smuggler's Notch (*Pringle et al.*).

Var. propinqua, forma **epilis**, f. nov. Ubique glabra.

Like var. *propinqua* but *glabrous throughout.*—Quebec, limestone detritus, crest of Cap Barré, Percé, July 23, 1905 (*Collins & Fernald*, no. 80. *Williams*); crevices of serpentine, Ruisseau au Diable, Mt. Albert, August 12, 1905 (*Collins & Fernald*). Here belongs the glabrous Iceland plant illustrated in Flora Danica, xvii. t. 2903, as *Alsine propinqua*.

Var. hirta (Wormskj.) Watson. *Glandular-pubescent: branches* 1–5-*flowered: fruiting calyx* 4–5 *mm. long*, about equalling the capsule. —Watson in King, Rep. 41 (1871) in part, and Bibl. Index, 98 (1878) in part; Robinson in Gray, Syn. Fl. i. pt. 1, 246 (1897) in part. *A. hirta* Wormskj. in Fl. Dan. x. 6, t. 1646 (1819) excl. syn.; DC. Prodr. i. 405 (1824) excl. syn.; Cham. & Schl., Linnaea i. 56 (1826); Hook. Fl. Bor.-Am. i. 99 (1830); Torr. & Gray, Fl. i. 181 (1838). *Alsine rubella*, var. *hirta* Gürke, Pl. Eur. ii. 258 (1899), which see for further synonymy.—Arctic and subarctic Europe: Greenland: arctic

America, extending south very locally to high mountains of COLORADO, UTAH and ARIZONA.

Var. RUBELLA (Wahl.) Watson. Glabrous or slightly pubescent; the *branches* 1- (*rarely* 2-) *flowered: calyx* 3–4 *mm. long*, shorter than the capsule.—Bibl. Index, 99 (1878); Robinson in Gray, Syn. Fl. i. pt. 1, 246 (1897). *Alsine rubella* Wahl. Fl. Lapp. 128, t. 6 (1812); Gürke, Pl. Eur. ii. 258 (1899), which see for further synonymy.— Arctic and alpine EUROPE and ASIA: GREENLAND: arctic America, very locally south to the Rocky Mountains of BRITISH COLUMBIA.

* * Leaves triquetrous, one angle conspicuously stronger than the other two: sepals with one rib stronger than the others.

+– Fruiting calyx exceeding the capsule, the tips of the sepals spreading: seeds reddish-brown 0.4–0.5 mm. long.

A. ROSSII Richardson. Densely caespitose, glabrous, the very leafy branches 2–10 cm. long: leaves slightly fleshy, triquetrous (often appearing nerved), linear-subulate to linear-lanceolate, glabrous: peduncles 0.5-2 cm. long, 1- (very rarely 2-) flowered: calyx wide-spreading in anthesis, becoming short-campanulate in fruit, 3–4 mm. long; the lanceolate or lance-ovate slightly fleshy sepals subulate-tipped, usually exceeding the narrow-oblong petals, or the latter often wanting.—Richardson in Franklin, Jour. 738—reprint 10 (1823); R. Br. in Parry, 1st Voyage, App. 272 (1823); Hook. Fl. Bor.-Am. i. 100 (1830); Torr. & Gray, Fl. i. 181 (1838); Porter & Coult. Fl. Col. 14 (1874); Robinson in Gray, Syn. Fl. i. pt. 1, 246 (1897). *A. elegans* Cham. & Schl., Linnaea, i. 56 (1826). *A. stricta* Watson, Bibl. Index, 98 (1878) in part, not Michx. nor *Alsine stricta* Wahl. *A. verna* Robinson in Gray, Syn. Fl. i. pt. 1, 245 (1897) in part, not L. *Alsine Rossii* Fenzl, Verbreit. Alsin. tab. ad 18 (1833) and in Ledeb. Fl. Ross. i. 356 (1841).— Arctic Northwest America and Northeast ASIA, south in the mountains to COLORADO and OREGON. Arctic specimens have the calyx crimson-tinged, while those from southward have greenish calyces but no other apparent differences.

+– +– Fruiting calyx shorter than the capsule, the sepals with appressed-ascending tips: seeds black, 0.7–0.9 mm. long.

A. **litorea** sp. n. Laxe caespitosa; ramis rigidis glabris 0.2-1.7 dm. altis; foliis lanceolato- vel lineari-subulatis carinatis, inferioribus confertis fasciculatis, superioribus subdistantibus; panicula plerumque dichotoma pauciflora, pedicellis rigidis; calyce 3–4.5 mm. longa, sepalis anguste ovatis apice subulatis trinerviis glabris granuliferis marginibus late hyalinis; petalis anguste oblongis calyce brevioribus vel eo subaequantibus; capsulis ovoideis calyce longioribus.

Loosely caespitose, the wiry glabrous branches 0.2–1.7 dm. long, leafy only at the base: leaves lance- to linear-subulate, carinate, subtriquetrous, one nerve or angle more prominent than the other two, crowded at base, fasciculate, all but the uppermost exceeding the internodes: inflorescence 1–12-flowered, usually paniculate, the pedicels rigid and strongly ascending: calyx 3–4.5 mm. long; the narrow-ovate subulate-tipped sepals strongly 3-ribbed, glabrous, granular-roughened, with broad hyaline margins: petals narrowly oblong, shorter than or barely equalling the sepals: capsule ovoid, exserted. — Quebec, sandy and gravelly beach of the Baie des Chaleurs, Tracadigash Point, Carleton, July 22, 1904 (*Collins & Fernald*), July 19, 1905 (*Collins & Fernald*, no. 81. *Williams*): Ontario, shore of Lake Superior (*C. G. Loring*); Peninsula Harbor, Lake Superior, October 9, 1896 (*G. S. Miller, Jr.*). Nearest related to *A. stricta* Michx. which has the longer more bristle-like stiffer leaves extending in remote fascicles nearly or quite to the inflorescence, the petals twice as long as the sepals, which are themselves longer than the mature capsule. It is probable that Pursh's *A. juniperina* (not *A. juniperina* L.) from Newfoundland and Labrador is, judging from his description, similar to the plant of the Baie des Chaleurs.

Gray Herbariam.

# NOTES ON NEW ENGLAND HEPATICAE, — IV.

Alexander W. Evans.

During the past year very few additions have been made to the hepatic flora of New England by the exploration of new localities, and most of the additions which are noted below have come to light through the study of old material. Attention is also called to several species which should apparently be reduced to synonymy. With the exception of *Frullania eboracensis* all of the species mentioned are common to Europe.

1. Lophozia excisa (Dicks.) Dumort. Recueil d'Obs. sur les Jung. 17. 1835. *Jungermannia excisa* Dicks. Pl. Crypt. Brit. **3**: 11. 1793. *J. excisa*, var. *crispata* Hook. Brit. Jung. *pl. 9.* 1816. *J. capitata* Hook. *l. c. pl. 80.* *J. intermedia* Lindenb. Nova Acta Acad. Caes. Leop. Carol. **14**, suppl.: 83. 1829. *J. intermedia, γ capitata* Nees, Naturgeschichte der europ. Leberm. **2**: 125. 1836. *Lophozia capitata* Macoun, Cat. Can. Pl. **7**: 18. 1902. Thorn Mt., Jackson,

New Hampshire (*A. W. E.*). In a note on *Lophozia bicrenata*[1] the writer made the statement that the true *L. excisa,* with which *L. bicrenata* has been confused in North America, had not been definitely reported from New England. The specimens recorded above, however, were already collected but through an error had been referred to another species. *L. excisa* agrees with *L. bicrenata* in its paroicous inflorescence. It is distinguished by its larger size and more delicate texture, the leaf-cells being thin-walled, except for the small trigones at the angles, instead of being uniformly thick-walled throughout. It also lacks the brownish or reddish pigmentation and the peculiar aromatic odor which are usually associated with *L. bicrenata.* In general appearance it bears considerable resemblance to small forms of *L. ventricosa.* Its paroicous inflorescence will at once separate it from this species, and it is usually easy to recognize the perigonial bracts, even after the antheridia have disappeared, by the small pocket or inflexed tooth at the antical base. In spite of the uncertainty connected with the original *J. excisa* of Dickson, most recent writers associate this name with the present plant.

2. Lophozia Muelleri (Nees) Dumort. Recueil d'Obs. sur les Jung. 17. 1835. *Jungermannia Muelleri* Nees; Lindenberg, Nova Acta Acad. Caes. Leop.-Carol. **14,** suppl.: 39. 1829. *J. acuta* Lindenb. l. c. 88 (in part). *J. Libertae* Hüben. Flora **15**: 305. 1832. *Lophozia acuta* Dumort. Recueil d'Obs. sur les Jung. 17. 1835 (in part). *J. Laurentiana* DeNot. Mem. Accad. Tor. II. **18**: 497. *f. 10.* 1859. *Lophozia Libertae* Cogn. Bull. Soc. roy. Bot. de Belgique **10**: 278. 1872. *J. bantriensis,* vars. *Muelleri* and *acuta* Lindb. Acta Soc. Sci. Fenn. **10**: 528. 1875. *J. Hornschuchiana β Muelleri* Massal. Ann. R. Ist. Bot. di Roma **3**: (8). 1888. On limestone rocks. Banks of the Housatonic River (opposite Falls Village), Salisbury, Connecticut (*A. W. E.*). Already reported from Miquelon Island, from a few stations in Canada and from Colorado, but apparently new to the eastern United States. *Lophozia Muelleri* is a member of a group of closely related species which have long been a puzzle to European hepaticologists. The group has recently been studied by Schiffner,[2] who ascribes to it the following characters: leaves always bifid; underleaves more or less developed even on slender stems; perichaetial bracts usually but little differentiated from the leaves;

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[1] Rhodora **4**: 209. 1902.

[2] Verhandl. der k. k. zool.-botan. Gesellsch. in Wien **54**: 381–405. 1904.

perianth cylindrical or barrel-shaped, terete (or slightly plicate in the upper part), contracted into a tubular beak; perigonial bracts with a third dorsal tooth. Schiffner recognizes seven species, five of which have been recorded from North America. *L. Muelleri* is distinguished from its allies by its relatively small size, by its more or less acute leaf-lobes, by its rather thin-walled leaf-cells with small but distinct trigones and a minutely verruculose or striate cuticle, by its dioicous inflorescence and by its lack of gemmae. Its nearest relative is doubtless *L. heterocolpa* (Thed.) M. A. Howe, which is known in North America from Greenland, from the shores of Lake Superior, and, in the Pacific Coast region, from Yukon to California. This species is a little larger than *L. Muelleri*, the lobes of its leaves are commonly obtuse, and it produces gemmae abundantly. Among New England species *L. excisa* and *L. ventricosa* both bear some resemblance to *L. Muelleri.* These species, however, are destitute of underleaves and their perianths are widely open and dentate at the mouth. Other members of the *L. Muelleri*-group are perhaps to be expected in New England, especially in limestone districts.

3. Lophozia porphyroleuca (Nees) Schiffn. Lotos **51**: (61). 1903. *Jungermannia porphyroleuca* Nees, Naturgeschichte der europ. Leberm. **2**: 78. 1836. *J. ventricosa*, b. *porphyroleuca* Limpr.; Cohn, Krypt.-Flora von Schlesien **1**: 280. 1876. Mt. Bigelow, Maine (*J. F. Collins* and *M. L. Fernald*, *1498*, *1573*). White Mountains (*W. Oakes*). Guilford, New Hampshire (Mrs. Corter). Although this species was recorded from New England by Austin[1] many years ago, it has received but scant attention from North American writers and has usually been considered a simple synonym of *L. ventricosa.* Even in Europe it has been looked upon as a species of doubtful validity. When Arnell[2] studied the forms belonging to the *ventricosa*-group a few years ago he found that the leaf-cells in *L. porphyroleuca* had large trigones while those of *L. ventricosa* had small trigones or were thin-walled throughout. Since these differences were inconstant and he could find no others to support them, he decided that *L. porphyroleuca* was hardly worthy of specific rank. Recently, however, Schiffner has shown that other differential characters may be derived from the mouth of the perianth. In *L. porphyroleuca* this is split into numerous acute lobes; the mar-

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[1] Proc. Acad. Philadelphia for 1869: 220.

[2] Bot. Not. 1890: 194. E. Bauer has published a German translation of Arnell's paper in Lotos **41**. 1893.

gins of these lobes are thickly and irregularly ciliate-dentate, some of the teeth attaining a length of three or four cells. In *L. ventricosa* the lobes are indistinct, and the marginal teeth are scattered and usually unicellular. It may be added that *L. porphyroleuca* grows on rotten wood and is commonly more or less tinged with red, while *L. ventricosa* usually grows on the ground or on rocks and is mostly dark green in color. Although reported from so few localities *L. porphyroleuca* is probably widely distributed in the mountains of New England.

4. LOPHOCOLEA HETEROPHYLLA (Schrad.) Dumort. Recueil d'Obs. sur les Jung. 15. 1835. *Jungermannia heterophylla* Schrad. Jour. für die Bot. **5**: 66. 1801. *J. crocata* DeNot. Mem. Accad. Torino II. **1**: 323. *f. b, 1–4.* 1839. *Lophocolea crocata* Nees, G. L. & N. Syn. Hep. 160. 1845. *L. Macounii* Aust. Proc. Acad. Philadelphia for 1869: 223. *L. minor* Aust. Hep. Bor.-Amer. *65b.* 1873 (not Nees). *L. Austini* Lindb. Acta Soc. Sci. Fenn. **10**: 503. 1875.

*Lophocolea heterophylla* is one of the most widely distributed of our hepaticae, its range extending across Europe, Asia and North America. It is essentially a plant of temperate regions and is not found in the far north nor on high mountains. It is apparently absent also from the tropics, although it has been reported in North America from as far south as Louisiana. Wherever it occurs it is likely to be abundant and it is usually one of the first plants which a beginner collects.

Few species are more variable. Plants growing in the sun appear very different from those in the shade. Plants on rotting wood (the most frequent substratum) tend to be more robust than those growing on the earth. Old plants often show peculiarities which are not to be observed in young plants. In spite of this very wide range of variability it seems impossible to recognize definite groups of individuals within the limits of the species as ordinarily understood. In other words *L. heterophylla* cannot well be segregated into a group of more elementary species. A single tuft, for example, will often show all gradations between juvenile conditions and those which are associated with maturity. Even a robust individual frequently develops branches which are slender and poorly developed, and it is not unusual for a stem or branch to retain certain of its juvenile peculiarities until its growth is terminated by the appearance of archegonia.

One of the most constant characters of the species is its paroicous inflorescence, although here as in most paroicous plants a purely male branch may occasionally be found. The variability of the species is best expressed by the leaves, the bracts and the perianths. The underleaves and bracteoles are rather more constant but still vary to a considerable extent.

On young and slender branches the leaves are distant and deeply bifid, with sharp lobes and a sharp sinus, the outline varying from rectangular to ovate, elliptical, or obovate. On more robust axes the leaves are usually broader and more or less imbricated, while the apical sinus tends to become more and more shallow, varying from acute to lunulate; on many leaves there is no sinus whatever and the apex is truncate. With these variations in the sinus the lobes show corresponding differences, tending to become blunter and blunter, and in a leaf without a sinus the lobes are represented by the obtuse or rounded upper angles of the leaf. Although the variation follows no definite order, there is a tendency for the truncate leaves to appear in the upper part of a fruiting stem. According to Howe[1] the leaf-cells vary from 24 $\mu$ to 48 $\mu$ in diameter; their walls are thin, but their trigones, although small, are usually distinct. Sometimes, however, the cells are thin-walled throughout. The margins of the leaves are commonly entire but sometimes show minute crenulations due to projecting cells.

The perigonial bracts, each with a single antheridium, are nearly always in from three to five pairs just below the two perichaetial bracts. Occasionally one of the latter also bears an antheridium. The extreme variability exhibited by the perichaetial bracts can be clearly brought by quoting published descriptions. According to Nees von Esenbeck[2] they are larger than the stem-leaves, almost erect in the lower part but squarrose above, subrectangular in outline and truncate-trilobed at the apex, the inner of the two being often more deeply incised and toothed than the other. Hübener[3] says that the bracts are denticulate on the margin and two- or three-dentate at the apex, which is squarrose or even reflexed. Limpricht[4] describes them as being long-rectangular in outline and shortly three to five lobed at the squarrose apex. Warnstorf[5] agrees pretty closely with Limpricht and describes the apex as being truncate and bluntly two or more lobed.

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[1] Mem. Torrey Club **7**: 116. 1899.

[2] Naturgeschichte der europ. Leberm. **2**: 345. 1836.

[3] Hep. Germ. 148. 1834.

[4] Cohn, Krypt.-Flora von Schlesien **1**: 304. 1876.

[5] Kryptogamenfl. der Mark Brandenburg **1**: 247. 1902.

In Husnot's[1] description the bracts are said to be divided into two dentate and acute lobes, while Boulay[2] describes them as erect and emarginate at the apex or bifid and denticulate. Howe[3] ascribes to them a truncate or retuse apex, and Pearson[4] states that they are oblong-quadrate in form, undivided or obtusely emarginate at the apex, the margin being entire or bearing one or two teeth. The study of a series of specimens, either European or American, soon makes it evident that these various descriptions, although so different, are all substantially correct and that a complete characterization of the bracts should be elastic enough to include all these diverse conditions. The perigonial bracts are in many respects intermediate between the bracts just described and the leaves but show a little pocket at the antical base, which encloses the antheridium.

The perianth is terete below but sharply three-keeled above and divided for about one third its length into three distinct lobes. The lobes are plane or nearly so and represent the prolongations of the three plane faces of the perianth, which are separated by the keels. It is in these lobes that the variability of the perianth becomes manifest. They are sometimes truncate and undivided, sometimes retuse and sometimes distinctly bifid; the margin may be either entire or more or less toothed, the teeth being irregular in number, in distribution and in size. Apparently there is sometimes a correlation between strongly toothed lobes and strongly toothed bracts, but this is not always to be discerned, and it frequently happens that the lobes of a single perianth will vary among themselves.

The underleaves are deeply divided into two slender and acuminate divisions. They are either entire on the margins or bear a single tooth on one or on both sides, the lateral teeth being usually only one or two cells long. The perichaetial bracteole is usually similar to the other underleaves but is considerably larger. Sometimes, however, it is irregularly dentate or lacerate.

So far as the writer can determine after careful study, Lindberg's *Lophocolea Austini* should be considered a synonym of *L. heterophylla*. Lindberg based his species on the specimens which Austin distributed in his Hep. Bor.-Amer., *65b*, as *L. minor*. He accredits it with a paroicous inflorescence as in *L. heterophylla* but states that it is a smaller plant, that the leaves are all deeply lobed, the lobes and usually the sinus being acute, that the leaf-cells are only half as large and that the two primary divisions of the underleaves are equally bifid. In another place[1] he adds that the leaf-cells have trigones, that the bracts are incised and that the lobes of the perianth are strongly toothed. Unfortunately the characters drawn from the leaves and underleaves are not so definite as the description implies. Austin's material shows leaves which are retuse or undivided on plants which bear bifid leaves as well, and the lateral teeth of the underleaves, even when present, are distinctly shorter than the main divisions, this inequality being maintained even in the perichaetial bracteole. The leaf-cells, to be sure, are mostly between 21 $\mu$ and 28 $\mu$ in diameter, but it is easy to duplicate these measurements on European material of *L. heterophylla*. Of course the characters derived from the bracts and perianth are too indefinite to be relied upon.

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[1] Hep. Gall. 53. 1875.

[2] Musc. de la France **2**: 81. 1904.

[3] Mem. Torrey Club **7**: 117, 1899.

[4] Hep. British Isles 251. 1900.

Another plant which is apparently a form of *L. heterophylla* is *L. Macounii*. Austin records it from Canada and from New York, and it was distributed as *No. 66* of his Hep. Bor.-Amer. According to the original description *L. Macounii* is distinguished by its small size, by its crenulate leaf-margins, and by its pink underleaves with filiform divisions, each usually composed of a single row of cells. The leaves are described as varying from sharply bifid to retuse or undivided and the bracts as irregularly two to four repand-dentate. Lindberg recognizes the species and notes that the inflorescence is paroicous and that the lobes of the perianth are strongly toothed. It will be seen that these differential characters would not be of much moment even if they were constant, and an examination of Austin's specimens shows that they are subject to variation.

The European *L. crocata* was long misunderstood by writers. It is here included under *L. heterophylla* on the authority of Massalongo,[2] who examined the type-material of De Notaris. Two other doubtful species are *L. Hallii* Aust.,[3] of Illinois, and *L. profunda* Nees,[4] of Russia. Both of these species were described from sterile material, and neither has been collected a second time. So far as the descriptions go they might easily be included in the cycle of *L. heterophylla*, but of course this could only be decided from the study of the types.

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[1] Kongl. Sv. Vet. Akad. Handl. **23**$^5$: 23. 1889.

[2] Ann. del. R. Ist. Bot. di Roma **3**: (9). 1888.

[3] Proc. Acad. Philadelphia for 1869: 222.

[4] Naturgeschichte der europ. Leberm. **2**: 342. 1836.

The reduction of *L. Austini* and *L. Macounii* to synonymy and the attempt to maintain as distinct such a species as *Marsupella media*[1] is perhaps open to criticism. It has just been shown that *L. Austini* passes into *L. heterophylla* by intergrading forms, but it seems to be also true that there are intermediate conditions between *M. media* and *M. sphacelata.* It must be further acknowledged that there is more difference between an ideal *L. Austini*, if such an expression be allowed, and an ideal *L. heterophylla* than there is between *M. media* and *M. sphacelata.* The two cases, however, are not entirely parallel. Typical specimens of *M. media* actually occur and are distinguished from typical specimens of *M. sphacelata* by slight but constant characters. In *L. heterophylla*, on the other hand, it is sometimes possible to find a whole series of gradations exhibited by a single individual.

5. SCAPANIA DENTATA Dumort. Recueil d'Obs. sur les Jung. 14. 1835. *Jungermannia nemorosa*, var. *purpurascens* Hook. Brit. Jung. *pl. 21, f. 16.* 1816. *Radula dentata* Dumort. Syll. Jung. 40. 1831. *Scapania Oakesi* Aust. Bull. Torrey Club **3**: 10. 1872. *S. purpurascens* Tayl.; Pearson, Hep. British Isles 225. *pl. 90.* 1900. New Hampshire: White Mountains (*W. Oakes*); Mt. Washington (*A. W. E.*). In the writer's Preliminary List of New England Hepaticae[2] no mention is made of *Scapania Oakesi*, although this species is definitely recorded from the White Mountains in the sixth edition of Gray's Manual. The cause of the omission was the uncertainty which existed at that time in regard to the plant. Austin based his species on a somewhat uncertain character, the carinal teeth on the uppermost leaves. This character has since been found to occur in other species, so that it cannot be relied upon. The specimens which Austin distributed in his Hep. Bor.-Amer. *14*, have recently been studied by Müller, who gives the results of the examination in his valuable "Monographie der Lebermoosgattung *Scapania* Dum."[3] He finds among these specimens three distinct forms, one referable to *S. undulata*, another to *S. dentata* and the third to *S. nemorosa*, but concludes that the second probably served as the type of Austin's species, which may therefore be reduced to synonymy.

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[1] RHODORA **6**: 167. 1904.

[2] RHODORA **5**: 170–173. 1903.

[3] Nova Acta Acad. Caes. Leop. Carol. **83**: 1–312. 52 pl. 1905.

The known range of *S. dentata* extends throughout nearly the whole of Europe, and it has been collected in about half a dozen widely scattered stations in North America. It has also been found in Japan. In some respects it is intermediate between *S. undulata* and *S. nemorosa*, and it has not received general recognition as a species until within the last few years. Its characters indeed are not altogether definite, and Müller includes forms under the var. *ambigua* (DeNot.) Massal., which might be referred to either *S. dentata* or *S. undulata*. Typical forms of the species are deep purple in color, and they differ from *S. undulata* and also from *S. nemorosa* in the fact that the antical lobes of the leaves scarcely arch across the stem. A full description of *S. dentata* may be found in Müller's monograph, pp. 97-115, and it is figured on plate 9.

6. SCAPANIA GRACILIS (Lindb.) Kaalaas, Nyt. Mag. f. Naturv. **33**: 243. 1893. *Martinellia gracilis* Lindb. Not. Soc. F. et Fl. Fenn. **13**: 365. 1874. Beech Mountain, Mount Desert, Maine (*W. G. Farlow*). The determination of these specimens was made by Professor Farlow and afterwards confirmed by Müller. Very little is known about the distribution of this species in North America, only two other localities, Greenland and Cape Breton, having been recorded. On the eastern side of the Atlantic its known range extends from Norway to Spain, Italy and the Canary Islands, mainly along the coast. Müller considers the species to be essentially maritime. He describes and figures it in his monograph, pp. 194–201, pl. 19a. *S. gracilis* resembles *S. nemorosa* in many respects but its leaves have larger and fewer teeth and its leaf-cells have larger trigones. An even closer ally is *S. Bolanderi* Aust., of the Pacific Coast region. This species, however, is distinguished by the bunch of marginal cilia at the base of the antical lobe. Certain writers take up for *S. gracilis* the Linnaean name *resupinata*, but, as Müller shows, there is so much uncertainty as to the original application of this name that it seems advisable to discard it altogether.

7. PTILIDIUM PULCHERRIMUM (Web.) Hampe, Prodr. Fl. Hercyn. 76. 1836. *Jungermannia pulcherrima* Web. Spic. Fl. Goettingensis 150. 1778. *Blepharozia pulcherrima* Lindb. Musc. Scand. 5. 1879. *Ptilidium ciliare*, var. *pulcherrimum* Warnst. Kryptogamenfl. der Mark Brandenburg **1**: 260. 1902. *P. pulcherrimum* has been recognized in Europe for a very long time, but there has always been a difference of opinion about it. By some writers it is considered a

distinct species, by others a variety or form of *P. ciliare* (L.) Nees. At the present time the first of these views is more widely held, and it is perhaps advisable for American hepaticologists to follow the example of the Europeans in this respect. At any rate the plant is distinct enough to merit their attention. *P. pulcherrimum* is distinguished from *P. ciliare* largely by a difference of habit. In *P. ciliare* the plants grow in loose tufts which are often three inches or more in depth; the individual stems are erect or nearly so and mutually support one another; they are sparingly branched, and the stem-leaves tend to be distant or only loosely imbricated. In *P. pulcherrimum*, on the other hand, which is a smaller plant, the stems are prostrate, and the plants form depressed mats which rarely attain a depth of half an inch. They are more intricately branched than in *P. ciliare*, and most of the branches, except those bearing perianths, are prostrate like the main stem, often giving a mat a stratified appearance. The stem-leaves tend to be densely imbricated. *P. ciliare* is abundant in northern and subalpine regions and becomes rarer toward the south. It grows on the earth or more rarely on rocks. *P. pulcherrimum* is more southern in its distribution but also occurs in cool localities. It commonly grows on logs or on trees, more rarely on rocks and apparently never on the earth. When well-developed there is usually no trouble in separating the two plants at a glance. Poorly developed or immature specimens are, however, sometimes indeterminable. The microscopic characters separating the plants are less definite than the macroscopic and are purely relative in their nature. In both species the divisions of the leaves and underleaves bear marginal cilia, but these are less numerous in *P. ciliare* than in *P. pulcherrimum*.

The following stations, quoted from the Yale herbarium, will give some indication of the distribution of these two species in New England, but both have doubtless been collected in many other localities:—

*P. pulcherrimum*. Maine: Moose River (*L. B. Tuckerman*); Owls Head Mountain, Buckfield, Oxford Co. (*J. A. Allen*); Orono (*E. D. Merrill*); Mt. Katahdin (*Cowles Party, 1, 8, 9, 16*); Mt. Kineo, Mt. Bigelow, and Carratunk (*J. F. Collins, 1758, 1518, 1563, 1484, 1771, 1775*). New Hampshire: Shelburne (*D. C. Eaton*); Cornish (*Miss Haynes*). Vermont: Leffert's Mills and Mt. Killington (*C. M. Cooke, Jr.*). Massachusetts: Deerfield (*Emmons*); West Newbury (*Miss Haynes*). Connecticut: Woodbridge, Hamden, Bethany, and Meriden (*D. C. Eaton*); Westville, North Haven, Seymour, and Salisbury (*A. W. E.*).

*P. ciliare.* Maine: Mount Desert (*D. C. Eaton*); Mt. Katahdin (*J. F. Collins, 2283*; *Cowles Party, 5, 13, 21, 28, 30, 31*); Mt. Bigelow (*J. F. Collins, 1489, 1569*). New Hampshire: Mt. Washington (*D. C. Eaton, A. W. E.*); Carter Dome (*A. W. E.*). Vermont: Jericho and Mt. Mansfield (*A. W. E.*). Massachusetts: Malden (*E. Faxon*). Connecticut: East Haven (*A. W. E.*).

8. FRULLANIA EBORACENSIS Gottsche; Lehmann, Pug. Plant. **8**: 14. 1844. *F. virginica* Gottsche l. c. 19. In the writer's "Revision of the North American Species of *Frullania*,"[1] *F. virginica* is recognized as a distinct species, although it is acknowledged that it cannot be well separated from *F. eboracensis* in a sterile condition. The differential characters which are there relied upon are drawn from the perianths. In *F. eboracensis* these are described as smooth and destitute of supplementary ridges, while in *F. virginica* they are said to be tuberculate and provided with several supplementary ridges. Even these differences are admitted somewhat tentatively, and the statement is made that there is occasionally a trace of an antical keel in *F. eboracensis.* The study of a wide series of specimens has since made it evident that the perianth in *F. eboracensis* is much less constant in its characters than had been supposed and that it not infrequently shows a tuberculate surface and also supplementary ridges. In fact a single specimen will often show gradations between a perianth of this type and a smooth perianth. In view of these facts it seems necessary to reduce *F. virginica* to synonymy and to consider it one of the many forms of *F. eboracensis.* Understood in this broad sense the species now includes seven forms of *Frullania* which have been described as distinct species by various authors. It is exceedingly common in eastern North America and has been collected in each of the New England states.

In addition to the species noted in the preceding pages, *Cephalozia connivens* and *Chiloscyphus pallescens* may be recorded from Cumberland, Maine. The specimens were collected by E. B. Chamberlain and kindly communicated by Miss Haynes. The following species may also be recorded from Rhode Island: *Kantia Sullivantii,* Middletown (*A. W. E.*); *Lophozia bicrenata,* North Kingston (*A. W. E.*); *Odontoschisma prostratum,* Middletown (*A. W. E.*). The Maine record for *Metzgeria conjugata* and the Rhode Island record for

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[1] Trans. Conn. Acad. **10**: 1–39. pl. 1–15. 1897.

*Jamesoniella autumnalis*, which are marked in the Preliminary List with the sign "—," may now be marked with the sign "+." The Maine record for *Jungermannia pumila*, however, seems to have been based on an incorrect determination and ought to be stricken out.

Making the additions and subtractions as indicated above, the census of New England Hepaticae would stand as follows: Total number of species recorded, 135; number recorded from Maine, 83; from New Hampshire, 103; from Vermont, 81; from Massachusetts, 80; from Rhode Island, 64; from Connecticut, 96; from each of the six states, 35.

YALE UNIVERSITY.

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# TWO VARIATIONS OF CAREX GLAREOSA.

M. L. FERNALD.

ONE of the most characteristic sedges of brackish shores of the Gulf of St. Lawrence and of the broad estuary of the River is a small caespitose plant which ordinarily passes as *Carex glareosa* Wahlenb. There, in eastern Quebec and New Brunswick, the ordinary phase of the plant agrees with most of the arctic material and that of Scandinavia in having plump plano-convex broadly ellipsoid, ovoid or obovoid perigynia which usually taper abruptly to the short beak. A variation of the plant which is less common, and known to the writer only from Cacouna and Bic on the River St. Lawrence differs constantly in having fusiform perigynia which taper gradually to each end. Aside from the plants of Cacouna and Bic the only specimens in the Gray Herbarium with such narrow perigynia are two sheets from Sweden and one from Finland.

As these two phases of *Carex glareosa* occur in eastern Canada, they are well marked and very constant extremes, each occupying by itself large areas of brackish sandy or gravelly shore. At Cacouna and at Bic the plant with slender perigynia alone has been found, while at Rivière du Loup, Dalhousie, Escuminac, Bonne Espérance, and at numerous other places, the plant with short ovoid or obovoid perigynia appears to be the sole representative of the species.

As already intimated, this broad-fruited plant is generally much better known than the other, and as shown by herbarium-specimens it is the plant of Greenland, Alaska, the Behring Sea region, and of Spitzbergen and much of the Scandinavian and Finnish coast. In fact, the narrow-fruited plant is apparently so local that in most modern accounts of *Carex glareosa* it has received little or no recognition. Thus in Flora Danica, in 1865, the plant is described with perigynium "oblongo-ovali"[1] and in the beautiful colored plate the perigynium is shown three-fifths as broad as long. In Boott's Illustrations, in 1867, the plate[2] agrees with that in Flora Danica in showing as *C. glareosa* the plant with ovoid perigynia; and in Otsenfeld's Flora Arctica, in 1902, the plant is said to have the "utricles ovate,"[3] and the figure shows the utricle (perigynium) more than half as broad as long.

When, however, we compare with this commoner tendency of *Carex glareosa* the original description[4] and figure[5] of the species, we find that Wahlenberg's plant was not the form with ovoid perigynia so generally treated as *C. glareosa*, but the narrow-fruited and ordinarily less common plant. The original "capsulis oblongis acuminatis" indicates this, and the evidence is strengthened by the colored plate in Schkuhr, which shows a perigynium only one-third as broad as long; and the fact that both the Swedish specimens in the Gray Herbarium come from the Gulf of Bothnia, one from Bygdeå in Westerbotten and the other from the same region (the old district of Norrland) is at least a good indication that Schkuhr's beautiful illustration represents a characteristic plant of that coast.

From their manner of occurrence in eastern Canada, the two extremes seem clearly distinct, but since they apparently have no other distinguishing characters than the shape of their perigynia, they should be treated only as varieties of one species. These with their distribution as known to the writer may be summarized as follows:

CAREX GLAREOSA Wahlenb. Plant densely caespitose, weak and lax, the usually curved culms nearly filiform: leaves blue-green, flaccid, 0.5–1.5 mm. broad, plicate or involute: spikes 2 to 4, subapproximate, appressed-ascending, obovoid; the lower 4–9 mm. long, 2.5-4 mm.

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[1] Fl. Dan. xiv. t. 2430 (1865).

[2] Boott, Ill. iv. t. 494 (1867).

[3] Ostenfeld, Fl. Arct. 58, fig. 28 (1902).

[4] "*C. glareosa*: spiculis ternis terminali basi mascula subconfertis oblongis, squamis aequantibus, capsulis oblongis acuminatis convexissimo-planis subacutangulis nervosis; foliis angustissimis intimo multum breviore, culmo flaccido. *C. glareosa mihi* SCHKUHR; Car. tab. Aaa. fig. 97. *Hab.* in littoribus marinis glareosis Norvegiae septentrionalis, & ad Sinum Bottnicum." — Wahlenb. Act Holm. xxiv. 146 (1803)

[5] Schkuhr, Riedgr. Nachtr. 24, t. Aaa, fig. 97 (1806).

thick; the terminal larger, including the staminate base 6–11 mm. long: perigynia pale brown or drab, plano-convex, fusiform, tapering very gradually to the smooth beak and the shorter substipitate base, prominently striate-nerved, 2.5–3 mm. long, barely 1 mm. broad, distinctly exceeding the acutish or obtuse ferrugineous or purplish white-edged scales.— Act. Holm. xxiv. 146 (1803), and in Schkuhr, Riedgr. Nachtr. 24, t. Aaa, fig. 97 (1806).— Very local on wet gravelly or sandy sea-shores, NORWAY, SWEDEN and FINLAND: QUEBEC, damp brackish spots, Bic (*Collins & Fernald*); forming turf in brackish soil by the St. Lawrence, Cacouna (*Collins & Fernald*, no. 41, *Williams*).

Var. **amphigena**, var. nov. Perigyniis late ellipsoideis ovoideis vel obovoideis 2–3 mm. longis 1.3–1.9 mm. latis fere abrupte rostratis.— *Type*, salt-marsh, Escuminac Bay, Escuminac, Bonaventure Co., QUEBEC, June 29, 1904 (*M. L. Fernald*). Examined also from the following stations. LABRADOR, Turnavik Island, August 12, 1896 (*Cornell Party*): QUEBEC, maritime rocks, Bonne Espérance, July 26, 1882 (*J. A. Allen*); crevices of rocks, Watsheeshoo, July, 1882 (*St. Cyr*); Pointe des Monts, June 16, 1862 (*J. Bell*), rocks on coast, Grand Etang, August 1, 1882 (*J. Macoun*); Rivière du Loup, August 4, 1902 (*Williams & Fernald*): NEW BRUNSWICK, low damp spots, Dalhousie, July 4, 1904, (*Fernald*): ALASKA, Shumagin Island, July 15, 1872 (*M. W. Harrington*); Nunivak Island, August 8, 1891 (*J. M. Macoun*): BEHRING STRAITS, Arakamtchetchene Island, 1853–56 (*C. Wright*): GREENLAND, Jacobshavn (*J. Vahl*); Godhavn, 1870 (*Berggren*); Disco, July 24, 1902 (*Porsild*, no. 308): NORWAY, salt-marsh at mouth of River Altenelf, Elvebakka, July 6, 1868 (*Zetterstedt*): SWEDEN, Vesterbotten (*Lehmann*); Hernösand and Gefle (*J. Franzen & K. F. Thedenius*): RUSSIA, Kola, June 26, 1883 (*Hollmén*); Federersk, July, 1885 (*V. F. Brotherus*); Vasa, July, 1880 (*V. F. Brotherus*), June 16, 1884 (W. Laurén); Borgå, June 15, 1884 (*K. J. W. Unonius*).— This is *C. glareosa* of most authors, and is well illustrated in Flora Danica, xiv. t. 2430 (1865); Boott's Illustrations, iv. t. 494 (1867); and in Ostenfeld's Flora Arctica, 58, fig. 28 (1902).

GRAY HERBARIUM.

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AN EXTREME FORM OF BOTRYCHIUM VIRGINIANUM.— In June, 1905, while attending a field meeting of the Connecticut Botanical

Society, I collected at Lakeville, Connecticut, an unusual plant of *Botrychium Virginianum*, Sw. It is tall (two feet three inches) and stout in proportion. Just above the sterile segment of the frond the stem forks twice and each of the three resultant branches bears a large, perfectly developed, and heavily fruited fertile segment,— in every case about four and a half inches in height and with the lowest pinnae two to two and a half inches long. In other respects the plant is normal, though rather large for the species, and it grew in a patch of woods under seemingly normal conditions. Only in its three heads is the strength of its individuality apparent.

Mr. C. H. Bissell informs me that in D. C. Eaton's herbarium at Yale there are two specimens of *Botrychium Virginianum* which have three fertile segments, and several others which have two. The form, then, is by no means unprecedented, but its occasional recurrence may be worthy of note.— C. A. WEATHERBY, East Hartford, Connecticut.

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EARLY FLOWERING OF HEPATICA TRILOBA.— Writing to Professor G. L. Goodale, Mr. Denison R. Slade of Chestnut Hill, Massachusetts, sends the following note. "I wish to let you know that I found the Hepatica in full bloom in the woods of Newton [Massachusetts] on January 29, 1906. My father for a term of years, 1863 to 1895, kept a record of the dates when the above flower appeared in the same place. March 2, 1880, is the earliest at which it was found. He writes 'I once found them in blossom in Mount Auburn in March, 1846, but they rarely show themselves about Boston before the month of April.'"

*Vol. 8, no. 85, including pages 1 to 24, and plate 64, was issued 7 February, 1906.*

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